

2008

Early Intervention, Research and Therapy Center for Children with Autism

Nicole Marie Caccavo

Virginia Commonwealth University

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Early Intervention, Research and
Therapy Center for Children with Autism

nicole marie caccavo

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School of the Arts
Virginia Commonwealth University

This is to certify that the thesis/creative project prepared by Nicole M. Caccavo entitled “**Early Intervention, Research and Therapy Center for Children with Autism**” has been approved by her committee as satisfactory completion of the thesis/creative project requirement for the degree of Master of Fine Arts.

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Early Intervention, Research and Therapy Center for Children with Autism

By Nicole Marie Caccavo, BS, MFA

Thesis submittal for the fulfillment of a Master or Fine Arts degree in Interior Environments at Virginia Commonwealth University 2008.

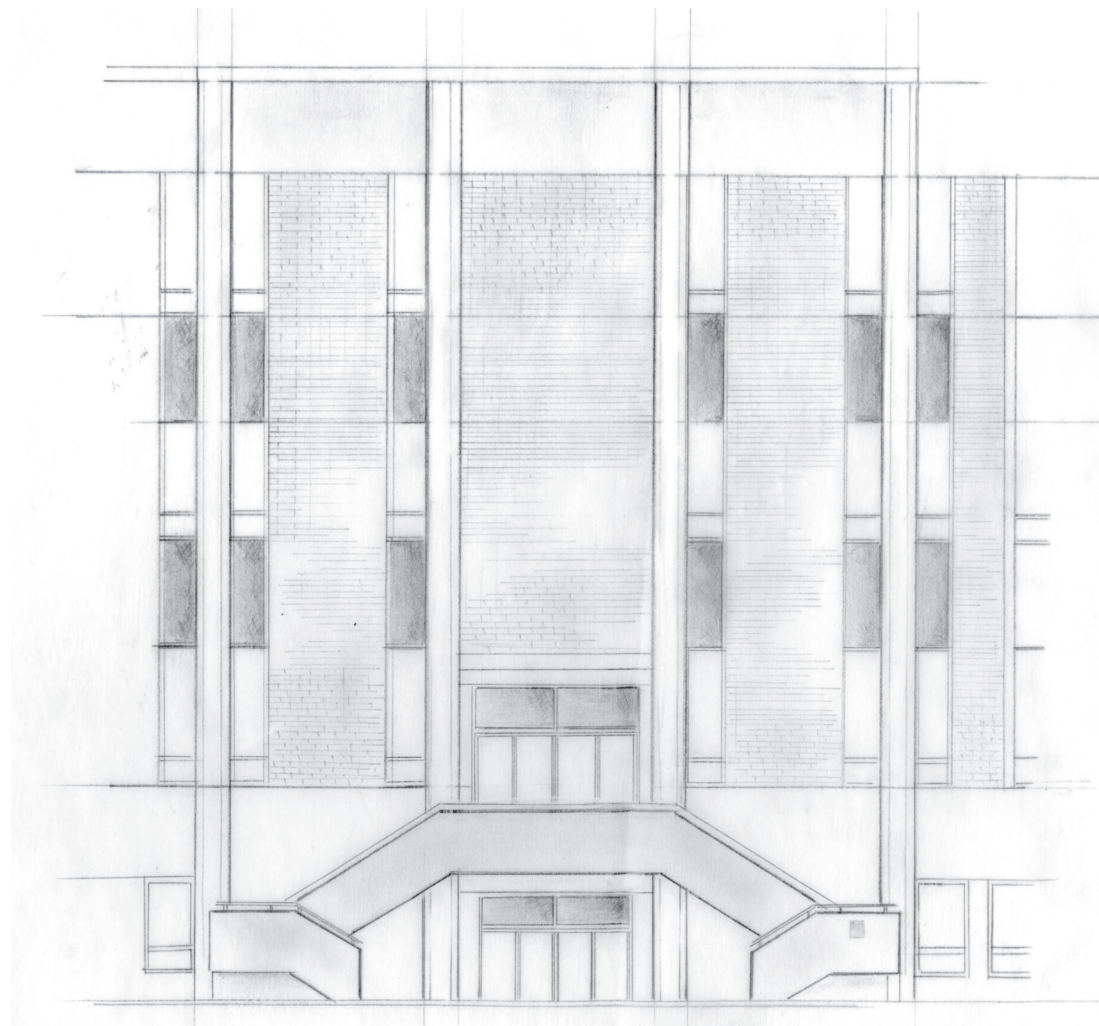
This book documents a design study and creative project undertaken toward the fulfillment of a Masters of Fine Arts Degree in Interior Environments at Virginia Commonwealth University in Richmond, Virginia. This book documents a year long accumulation of study and research done toward the development of an early intervention, therapy and research center for children with autism. This creative project demonstrates how an environment can be a catalyst for social interaction, way finding, therapy, and intervention. The goal was to design a space that would be multi-functional and also benefit the surrounding community. This design study will explain how colors and materials can affect children with autism and what colors and materials are detrimental to their functional abilities.

“a good school is one which promotes learning; an effective school is one where the pupils achieve more academically than could be predicted from their intake”

*~Peter Mortimore,
Educational specialist*

chapter I

introduction



This building will be used as an early intervention, research/educational and therapy center for individuals that are autistic or are on the pervasive developmental disorder spectrum. My hope is that this space will create areas for social interaction, research and learning to occur within the school and also within the VCU community. Each educational room will be designed so that observation/research can take place.

The following project takes place in the 138,000 sq.ft Franklin Street Gym located on the VCU campus in Richmond Virginia. The current area to be designed will be 8,000 sq.ft located on the basement floor of this building.

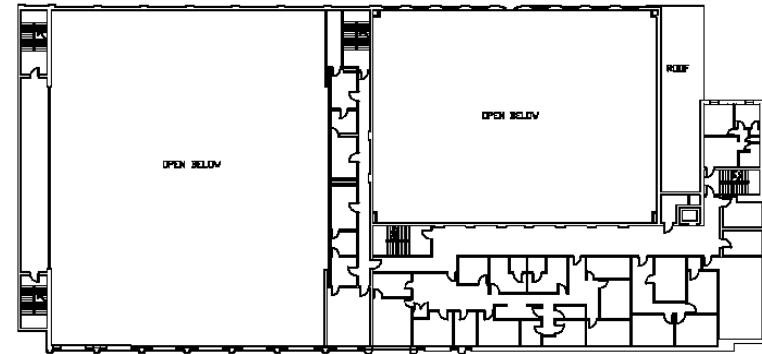
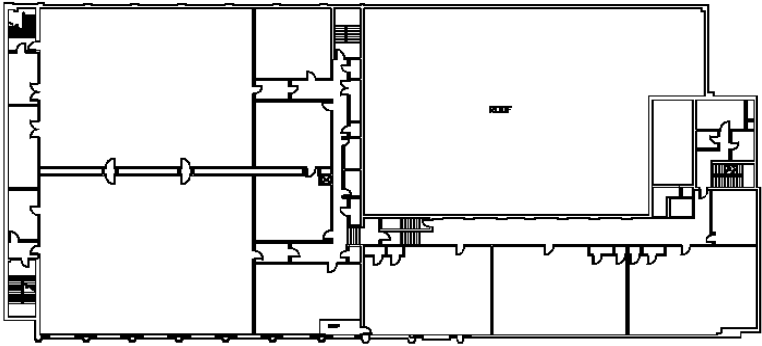
design manifesto

I believe that individuals with disabilities have the ability to teach designers. These special individuals have gifts to share. As designers we should harness their abilities and create environments where they are given the opportunity to share them. Design has the ability to provide early intervention and to create an environment where social interaction and learning brings typical learners together with atypical learners.

I believe that well thought out design can create an environment where individuals with disabilities are given the same opportunities as others. I believe that we have an obligation to create these types of environments for our own self learning and for the education and evolution of our society. I believe that it is not the individual with a disability that should change but the assumptions of the designer that need to be changed.

Forward thinking design that embraces what a future might hold for an individual is key to designing for disabilities. I believe that technology is a powerful tool for individuals with disabilities and as designers we need to take advantage of its benefits. I believe that great design does not have to be perfect, but should create a perfect way for humans to interact. Good design is contagious. We have the ability to create a contagious environment where education and learning can occur for individuals with and without disabilities.

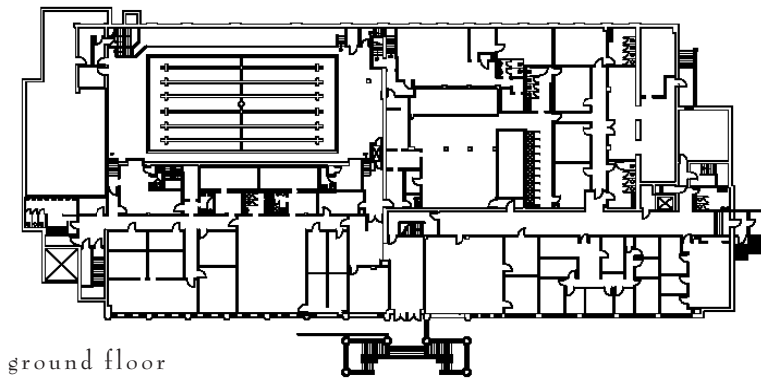
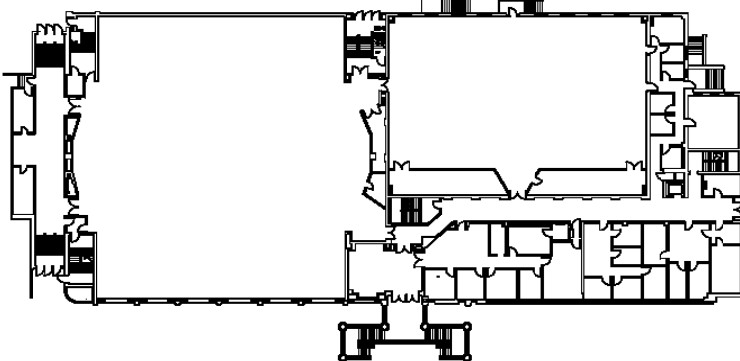
third floor



second floor

The Franklin Street Gym is located on Franklin St. on VCU's Monroe Park Campus. The building itself is four floors high and holds the Division of Health, World Studies, Physical Recreation, as well as many classrooms and offices. The campus swimming pool is located in this building on the ground floor. The building is located on the historic tour route between a mixture of historic buildings with varying heights and purposes.

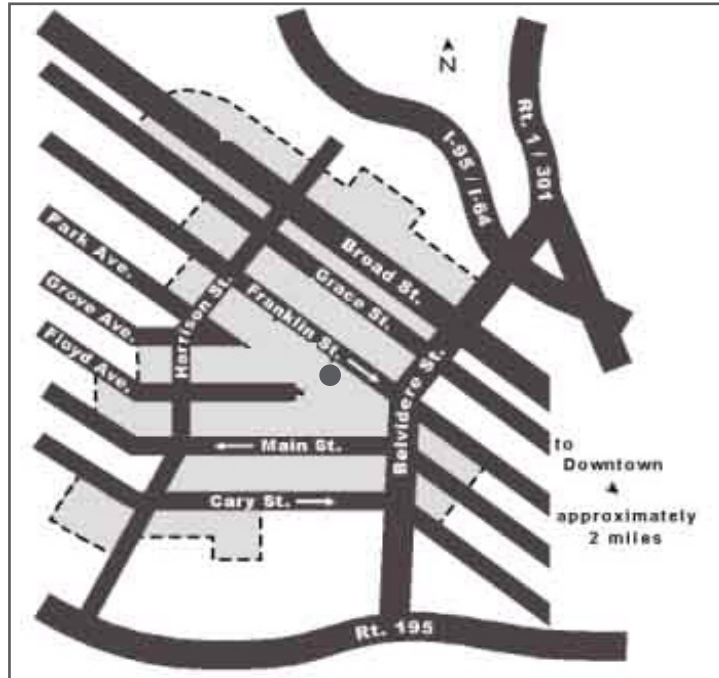
first floor



ground floor



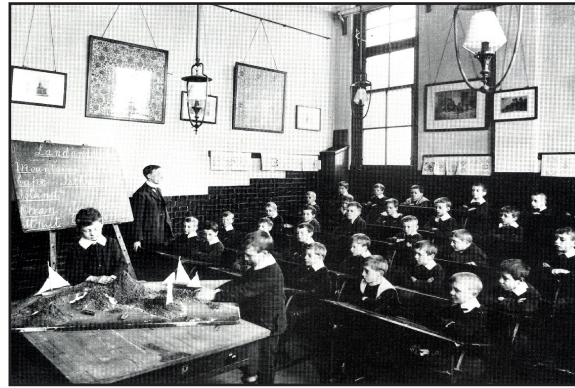
138,000 sq.ft.



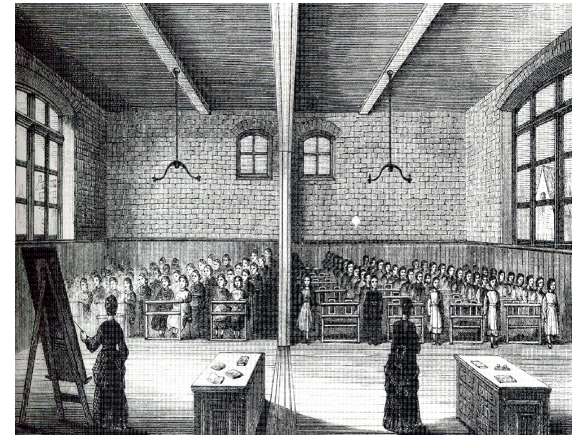


- How can the design be a catalyst for social interaction, way finding, therapy, and learning?
- How can the surrounding community benefit and vice versa?
- How can I incorporate multiple opportunities into one building? Can the space function as a resource center, training center, place of interaction, and still function as a school?
- What have other designers done in similar situations? How are other sites connected to their surroundings?
- Can a school curriculum or a theory be expressed in the design?
- Can the design be flexible so that group work and individual work is part of the design curriculum?
- How can I use the principles of universal design to help my design?
- How can I present the design in a way that incorporates varied modes of communication?
- How can the design affect future generations and use forward thinking? How can the design combine multiple intelligences for learning?

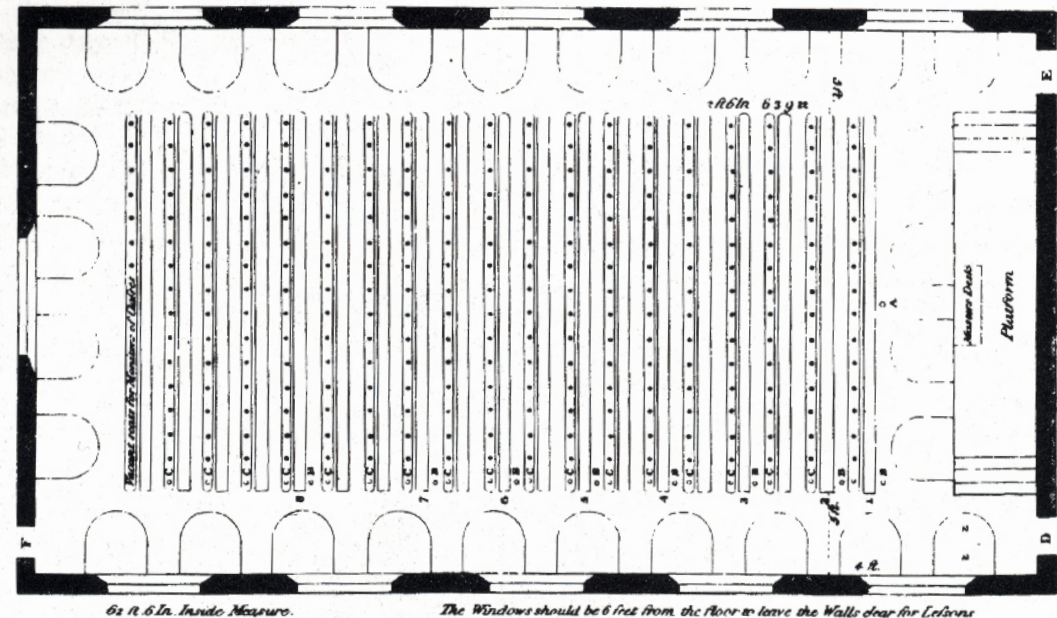
history of school design



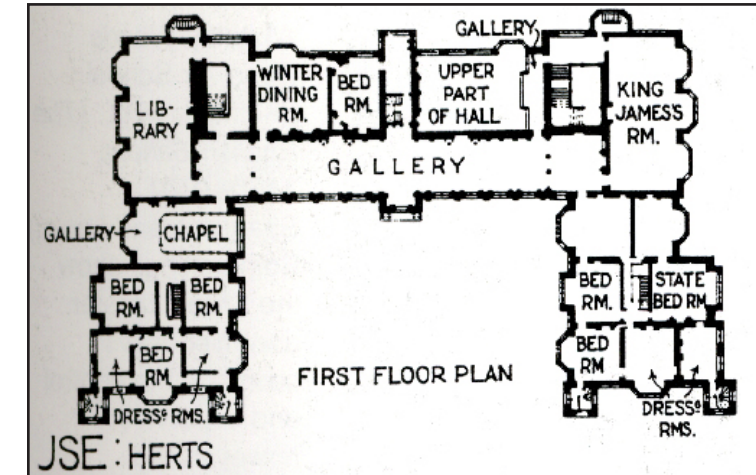
Oxford. Architecture of Schools. By Mark Dudek.



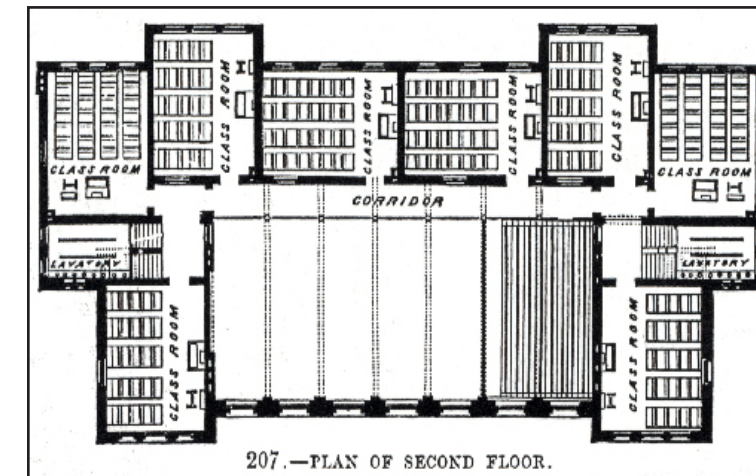
Oxford. Architecture of Schools. By Mark Dudek.



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Oxford. Architecture of Schools. By Mark Dudek.

This early nineteenth century floor plan of an english schoolroom seats 304 children. The views of the outside were regulated with windows starting at six feet above the ground. The schools at this time did not have separate classrooms. They were single rooms where an entire school would learn simultaneously. When a new Education Act was enacted in 1872, many schools were forced to change their plans, hence providing many jobs for architects in school design.

The new floor plans that began to surface after the nineteenth century were set up like rooms in homes. The concept of the corridor was an important part of these plans. Many of the schools today are similar to these floor plans. Rooms or sections in school buildings are often separated according to age groups or learning levels.

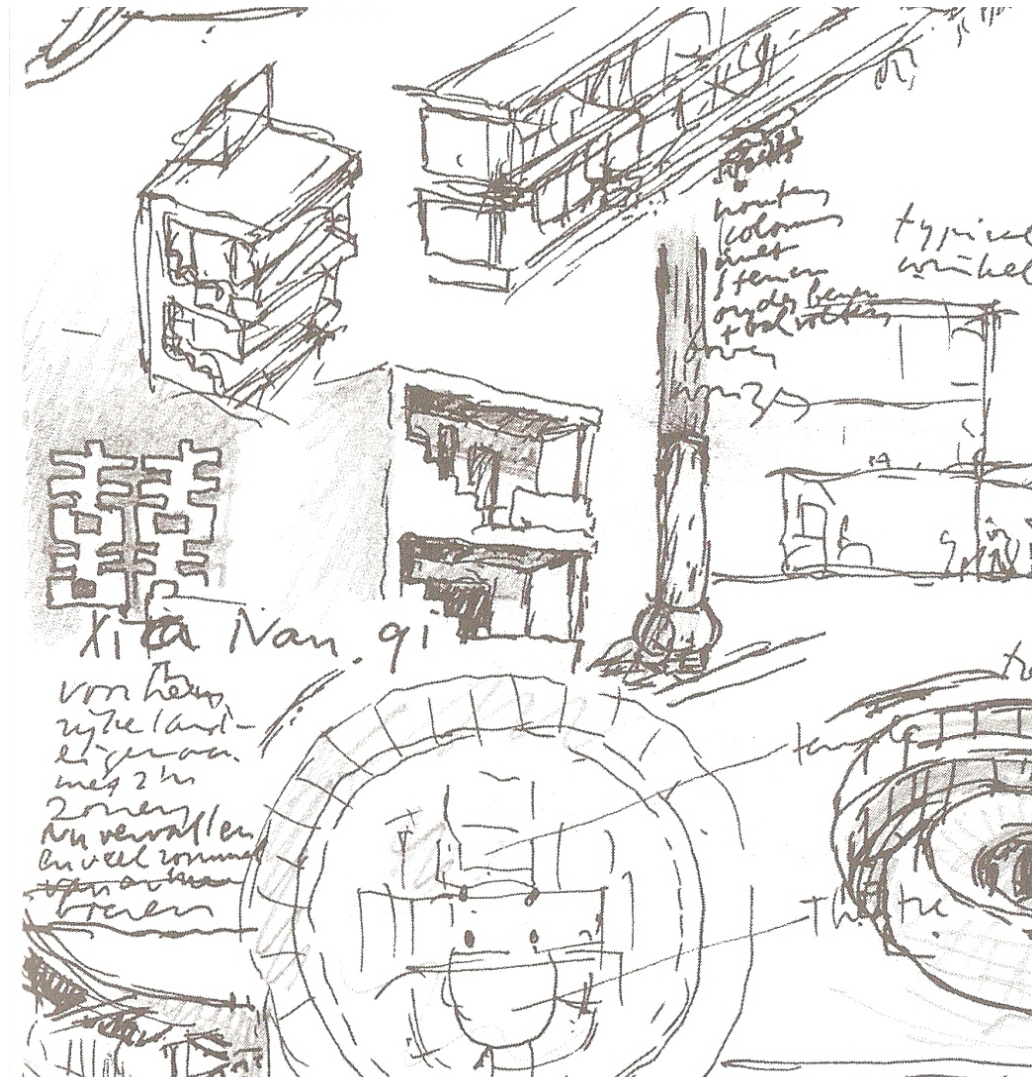
process:
a particular course of action intended
to achieve a result;
subject to a process or treatment, with
the aim of readying for some purpose,
improving or remedying a condition

Chapter II

*“a thing exclusively made for one purpose,
suppresses the individual because it tells
him exactly how it is to be used. If the object
provokes a person to determine in what way
he wants to use it, it will strengthen his self
identity”*

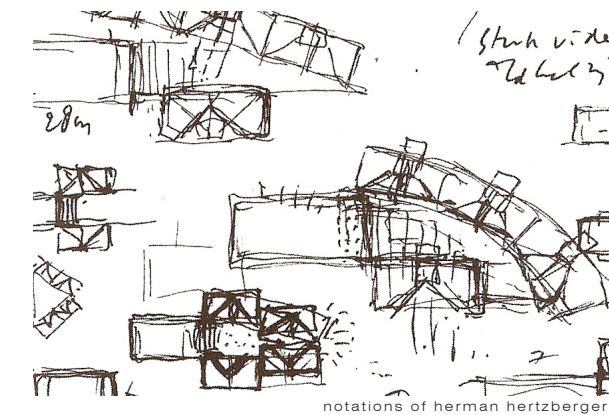
~Herman Hertzberger,

Dutch architect



study of public space in re-
lation to inside and outside

precedents

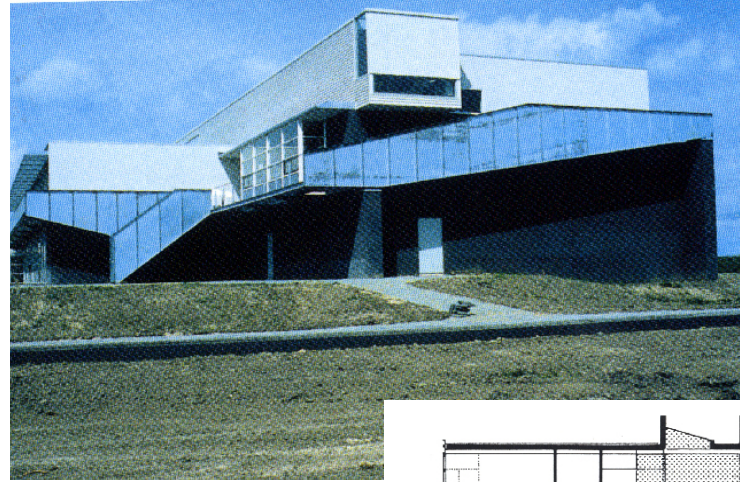


study of units
relative to
connectivity and
space

herman hertzberger

Hertzberger's process involves designing in between spaces where public meets private. The use of individual units to make connections between spaces is seen in many of his schools. He considers the schools "tiny self sufficient cities". Communal learning streets for students to meet are also a running theme in his designs. Social interaction, is an important strategy.

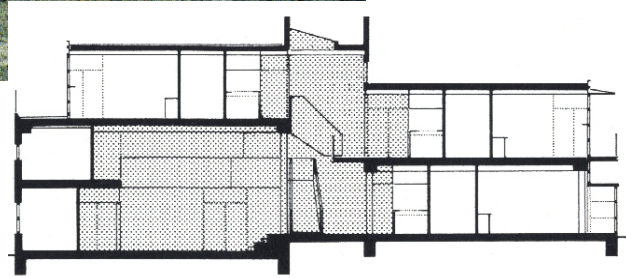
Hertzberger is interested in allowing the individual to determine how a space will function, instead of dictating how it should be used. His schools are influenced by the Schroeder House in Holland by Gerrit Rietveld. His social interaction strategies are a key process that I have taken as an example to study for the design of my center.



Boston. Herman Hertzberger.
By Herman Van Bergeijk.



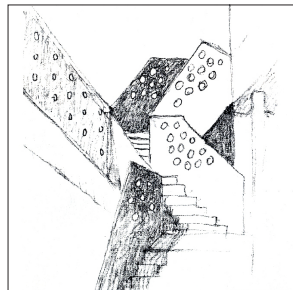
Boston. Herman Hertzberger.
By Herman Van Bergeijk.



A special needs school for children with educational and learning difficulties designed by Herman Hertzberger. The school is located within an existing park surrounded by public playing fields. The building itself is asymmetrical as well as very linear and compact.

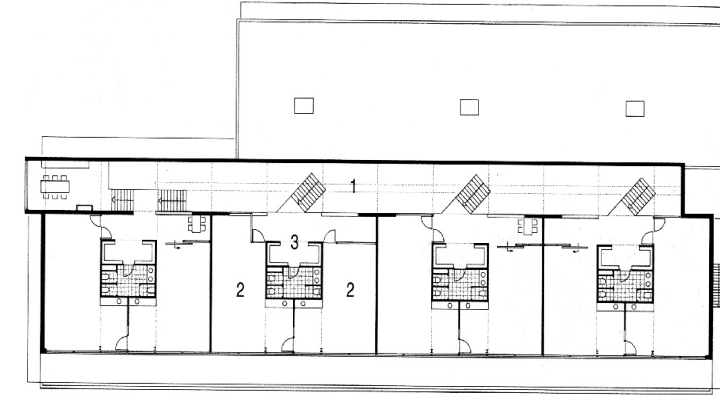
Fourteen classrooms are setup like boxes which interlock with horizontal planes. The building conveys a conjunction of light and heavy. Corridors were avoided therefore all rooms open onto an inner school square. A gallery runs around the school on the first floor which gives children an added area for exploration. Therapy rooms for music and movement are also part of the programming in De Bombardon.

This study was beneficial due to its programming requirements and the study of open spaces in schools and how they can contribute to an open floor plan.



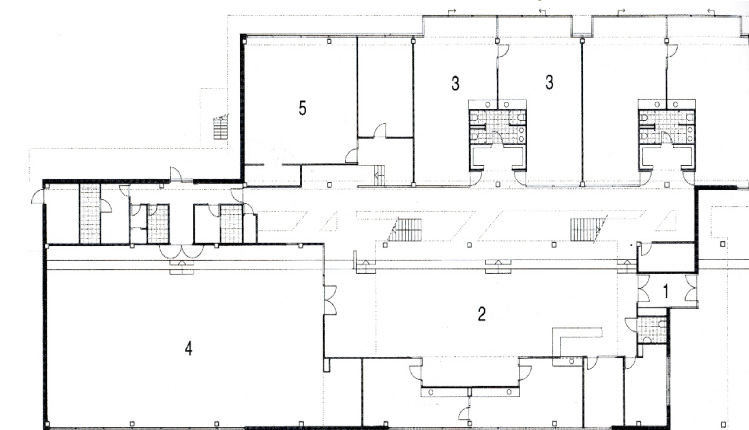
Boston. Herman Hertzberger.
By Herman Van Bergeijk.

de bombardon school almer, netherlands



second floor

- 1 gallery access
- 2 linked classrooms
- 3 wc/cloakroom



ground floor

- 1 entrance
- 2 communal space
- 3 classroom
- 4 gym
- 5 playroom

16,145 sq.ft



first floor

- 1 gallery
- 2 meeting area
- 3 classroom
- 4 gym
- 5 office

St. Coletta is a private, nonprofit school for children and adults with disabilities and autism. The mission of St. Coletta is teaching students life skills.

Designed by Michael Graves, the school is divided into five houses that serve each of the users groups based on age. The houses are grouped around a common area called the Village Green. Each house has a similar plan layout with a common room next to an open classroom and a teaching kitchen upstairs. Each of the houses is color coded for students to be able to identify their house.

The blocks of the building are a metaphor for the building blocks of life that the students hope to learn in this school. The houses also relate to the residential neighborhood that lies to the west.



michael graves design group



michael graves design group

inclusive design

concern with meaning and context

participative

human oriented

client redefined to include users

low cost

grass roots design approaches

democratic

seeking to change design attitudes

use of appropriate technology

non-inclusive design

concern with style and ornament

non-participative

corporate or institution oriented

owner as exclusive client

high cost

top-down design approach

authoritarian

acceptance of prevailing design attitudes

use of high technology

Principles of Universal Design

1 Simple Intuitive Use

use of design is easy to understand regardless of users knowledge, language skills or concentration levels

2 Equitable use

design does not disadvantage any groups of users

3 Perceptible Information

design communicates necessary information effectively to the user, regardless of ambient conditions or users sensory abilities

4 Tolerance for error

design minimizes hazards and consequences of accidental fatigue

5 Flexibililty in use

accommodates a wide range of individuals abilities

6 Low physical effort

design can be used efficiently and comfortably

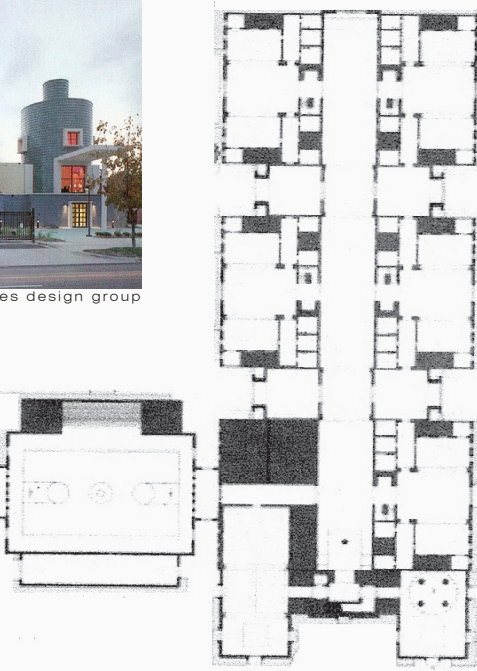
7 Size and Space for Use

appropriate size is provided for reach, manipulation and use regardless of body size, posture or mobility



michael graves design group

98,000 sq.ft.

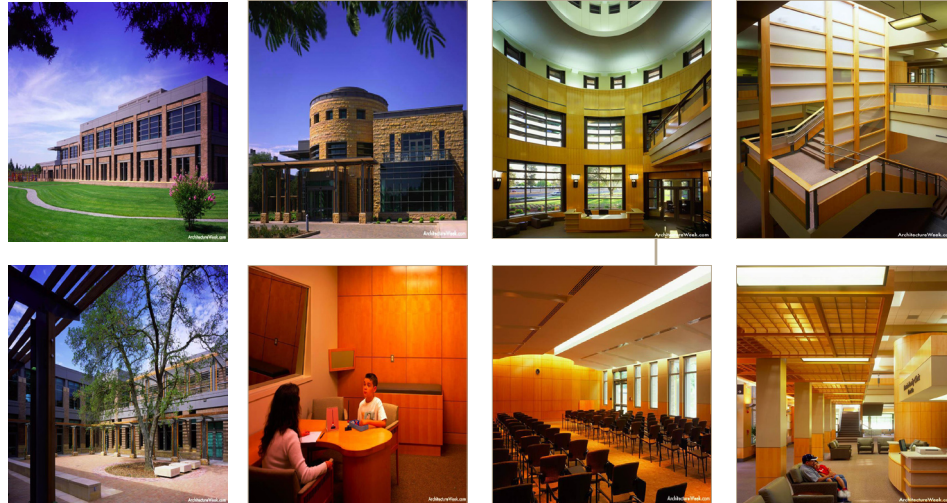


michael graves design group



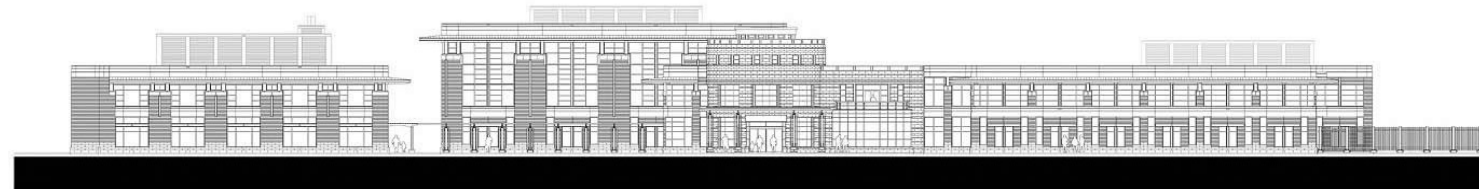
michael graves design group

mind institute davis medical center, sacramento california



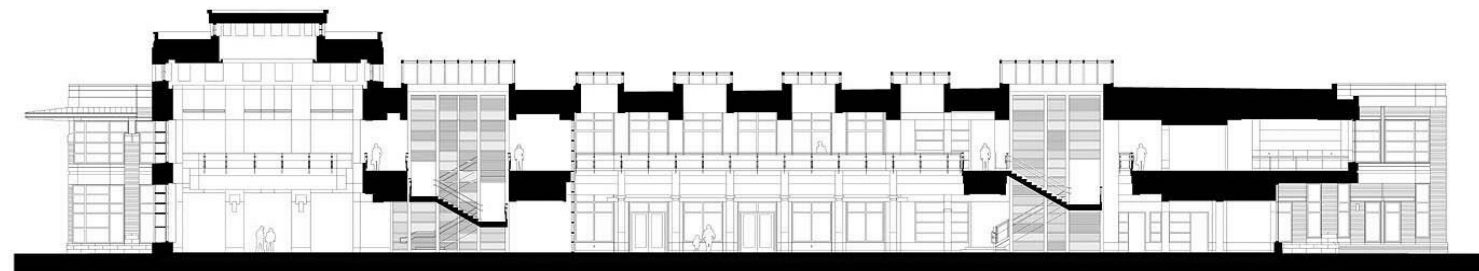
A multidisciplinary collaboration institute for autism founded by parents with autistic children. Spaces inside the building were set up to promote collaboration. Programming includes a resource center, outpatient clinic, academic office building a research lab, and a library. The design focused inward, working as a series of courtyards, instead of one building.

On the interior materials are warm and inviting giving the space a sense of calmness. This study will aid in the process of choosing materials and also will be helpful as a programming tool in terms of creating a community within one building



South Elevation

0 40



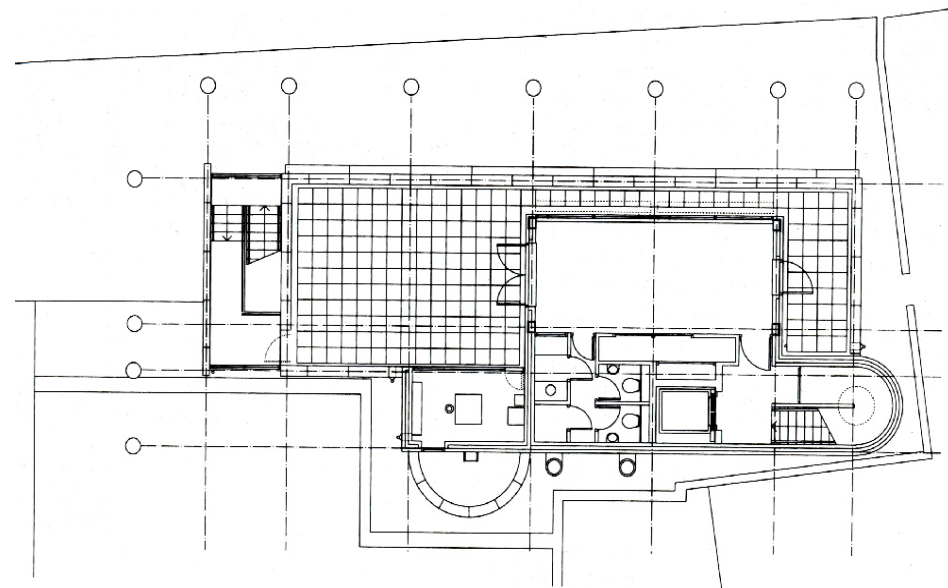
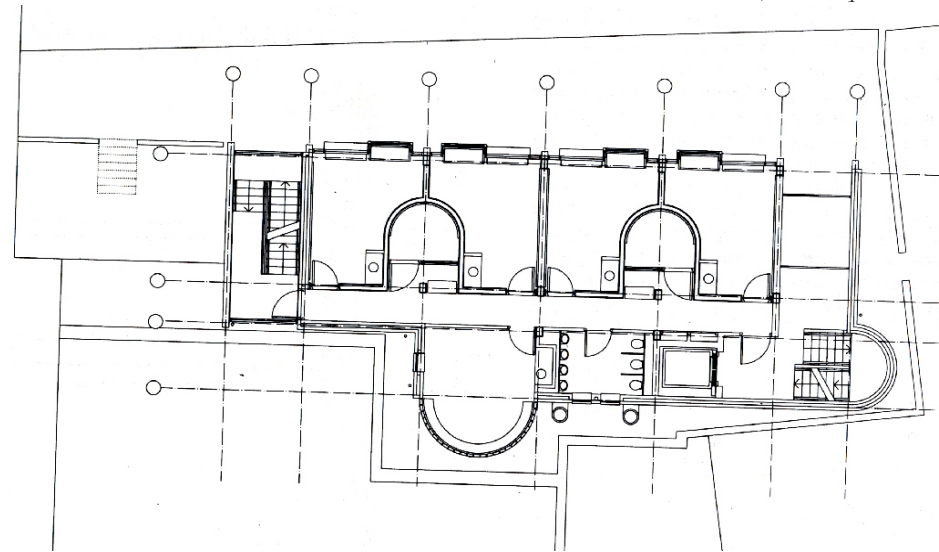
Section at Family Commons

0 20



first floor

3,660 sq.ft



ground floor

Twenty-four individual and small group therapy rooms and acoustically separated teaching therapy rooms are inside this small therapy space.

Projecting bay windows with fitted bench and shelf units provide views of the external space. The building itself is oriented to the south to take full advantage of the sun. The projecting bay windows increase dialog between the inside and out. The site is located within a mews surrounded by taller buildings and is organized in a three story block. The projecting bay window seats in the interior are wonderful learning area for children. The curved walls used in group therapy rooms symbolize the children's need for support.

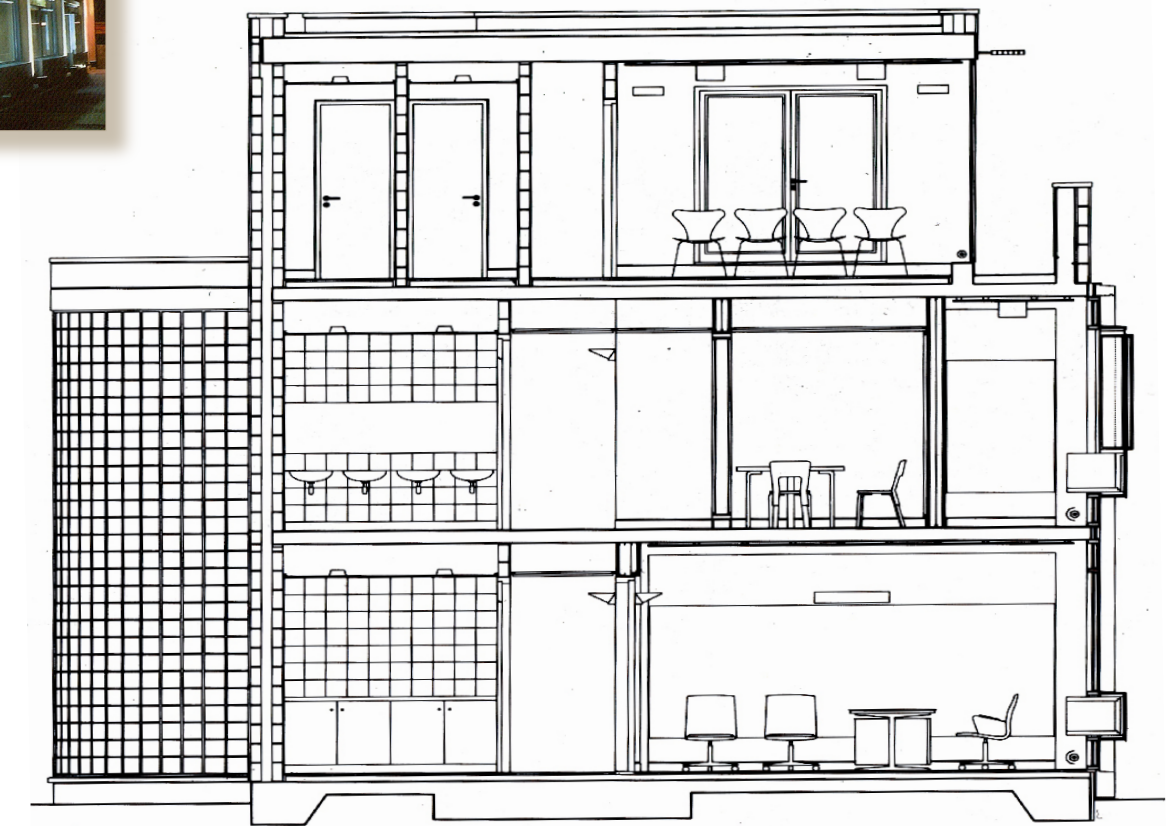
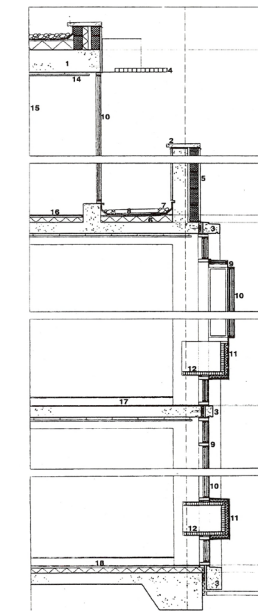


Oxford. Architecture of Schools. By Mark Dudek.

christopher place speech and learning centre, euston london



Oxford. Architecture of Schools. By Mark Dudek.



Charity run assessment and therapeutic teaching facility for children with hearing impairment and/or speech and language delays. The building itself takes advantage of external spaces using gardens. There is an ivy garden on the ground floor and a roof terrace garden which creates a calm, soothing environment in the center of its urban site.

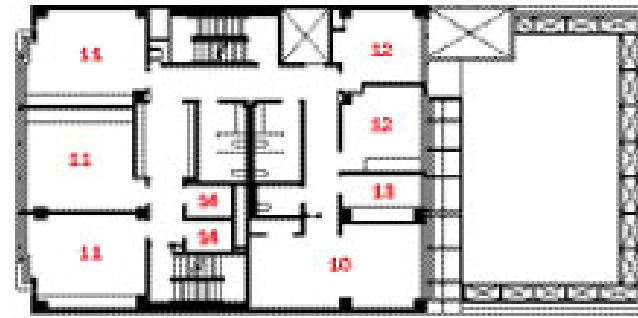
reece school new york, ny



Architectural Record



Architectural Record



Third Floor



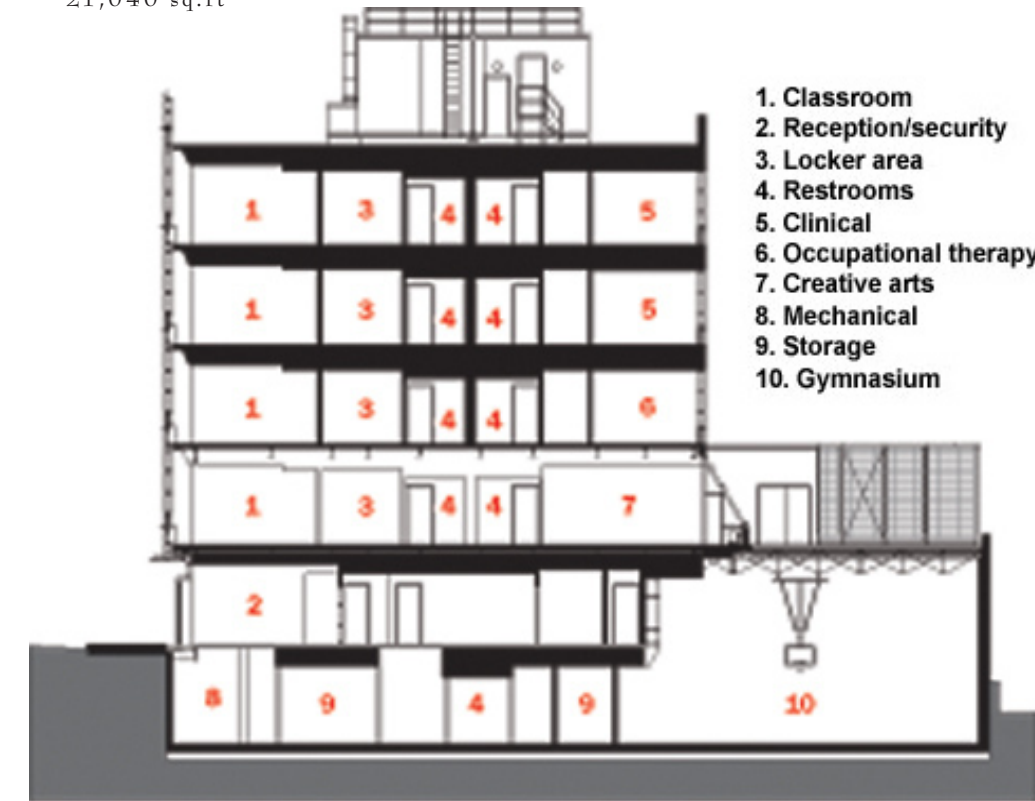
First Floor



Fifth Floor

1. Reception/security
2. Waiting room
3. Nurse's office
4. School store
5. Business office
6. Copy/support
7. Director's office
8. Multipurpose room
9. Electrical
10. Library
11. Classroom
12. Occupational therapy
13. Counseling
14. Quiet alcove
15. Staff lounge
16. Clinical room
17. Speech therapy

21,040 sq.ft



SECTION A-A

1. Classroom
2. Reception/security
3. Locker area
4. Restrooms
5. Clinical
6. Occupational therapy
7. Creative arts
8. Mechanical
9. Storage
10. Gymnasium

An urban school for children with emotional disorders, learning disabilities and speech/occupational impairments. The classrooms were intentionally made smaller to create a cozy atmosphere. This idea will also be implemented in spaces in my center to create a comfortable space for learning.



Architectural Record

great beginnings early education center, mo



designshare.com



designshare.com



designshare.com



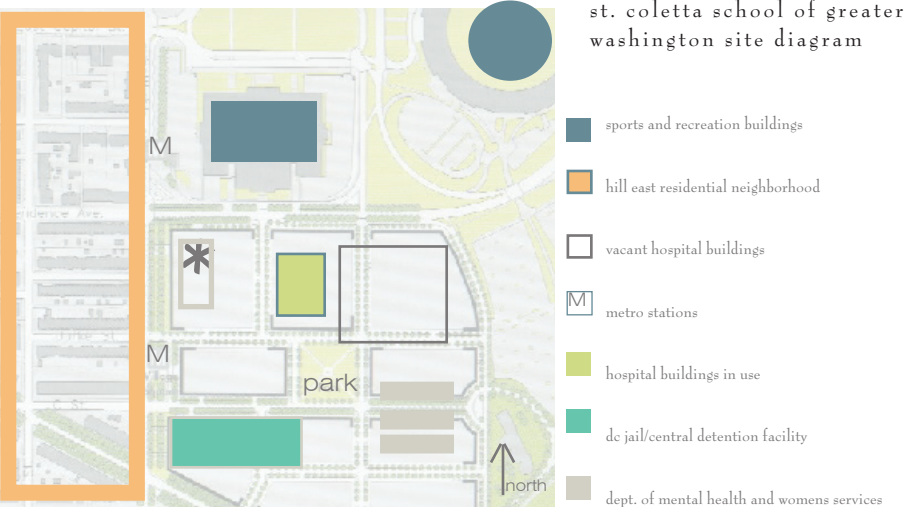
designshare.com

An Early Childhood Special Education Center as well as a Parents as Teachers program all reside in this building. The lobby of the building is a waiting area for therapy services as well as a play area for children. The library stationed beside the lobby was an important part of the design. Each classroom has observation windows and rooms that can be used as multi-purposed space. The building itself is oriented on a SE/NE axis to maximize sun and minimize radiant heat gain. The design of my center will include observation windows and lobby space for individuals waiting for therapy sessions.



designshare.com

site diagrams



educational areas of interest for a school as well as accessible entrances around vcu



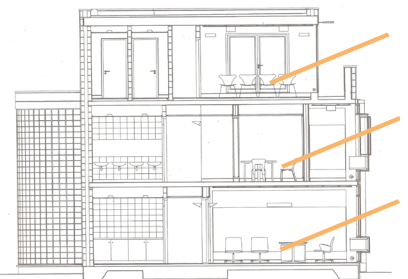
- | | | |
|----------------------|-----------------|---------------------|
| franklin street gym | cabell library | sacred heart church |
| fine arts building | student commons | anderson gallery |
| grace street theater | monroe park | music center |

site diagram of buildings surrounding franklin street gym

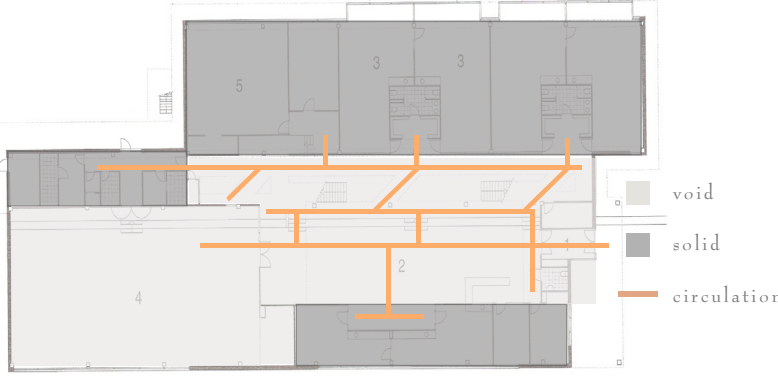


analytic diagrams

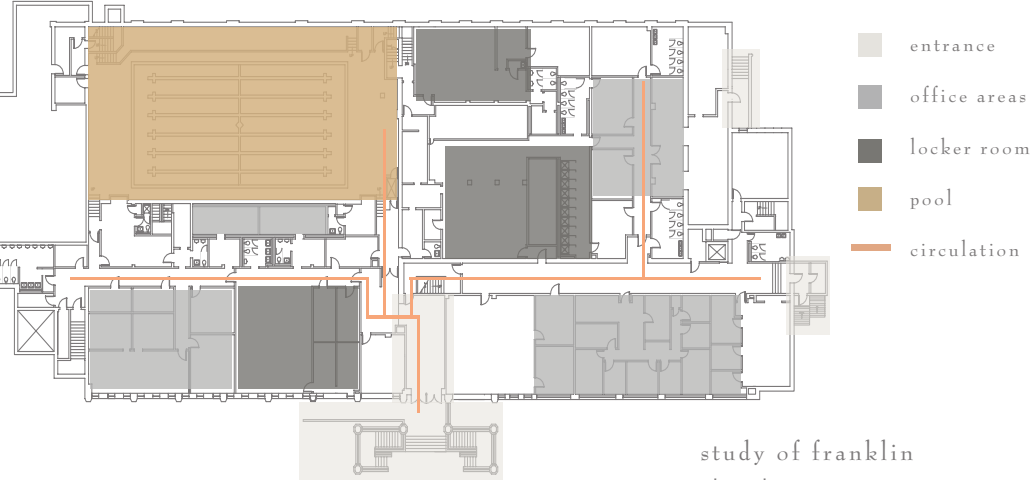
study of st. coletta of greater washington



light study of christopher place



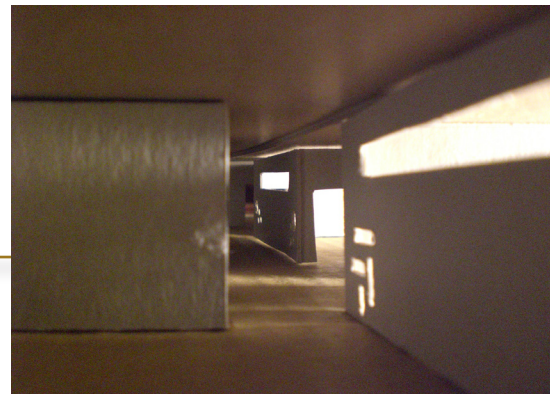
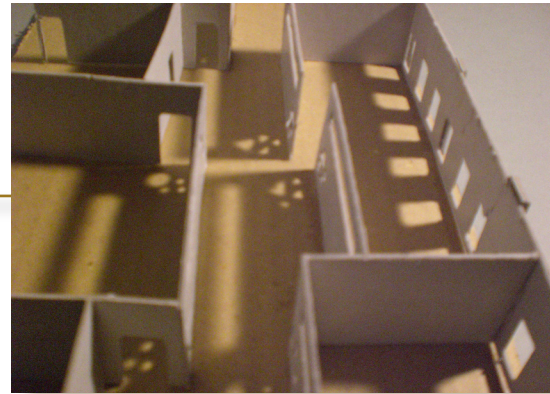
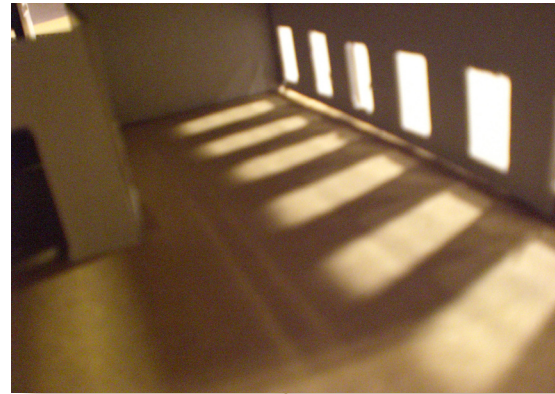
study of de bombardon school



study of franklin street gym

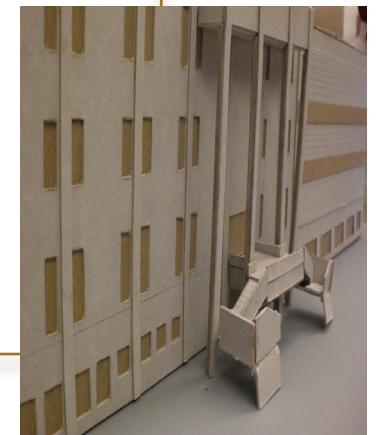
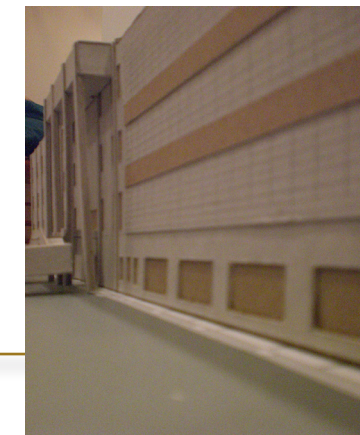
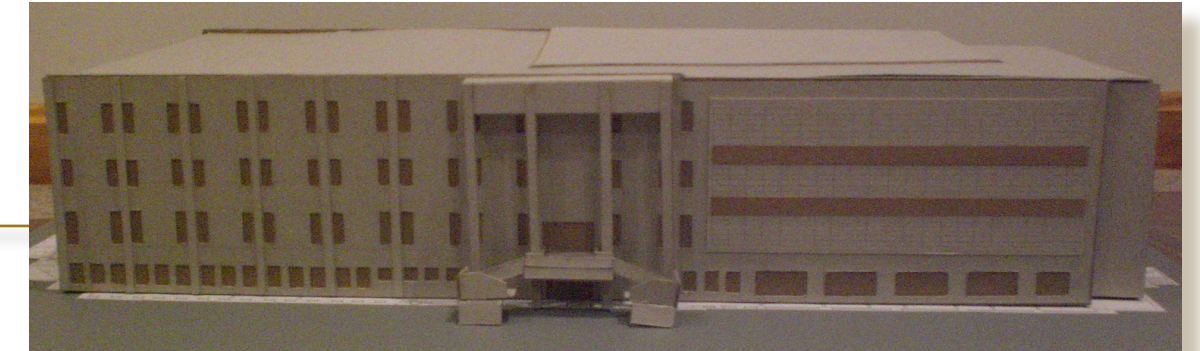
light studies

Light explorations and models gave insight into what the space would look like as sunlight enters. The glass windows at the top of the walls allow light to enter rooms that are lacking window views. The windows create natural light areas that would have otherwise been without. Research shows that natural light can affect the physiological well-being of children. When special education children spend their days trapped inside, it is important for them to be exposed to some spaces that offer natural daylight. Daylight can also reduce the electrical and heating load on the building.



models

Modeling the building allowed me to understand the structure of the building and decide which area to design. Doing this modeling provided me information on how the Franklin Street Gym is a new building wrapped around an older building.



*Our whole environment is built to the
specification and limitations of a normal
human perceptual system- and that's not the
same as an abnormal human system like an
autistic person's.*

~Temple Grandin

Chapter III

autism

A spectrum of neuropsychiatric disorders characterized by deficits in social interaction, communication, and unusual or repetitive behavior. Some individuals are non verbal.

therapy models

The following therapy models will ultimately be able to be implemented into the final design of the building:

Applied Behavior Analysis is a method that uses the principle of positive reinforcement to strengthen a behavior by arranging for it to be followed by something of value to the child. It has been used to develop a wide range of skills in learners.

Floortime is based on the premise that the child can increase and build a larger circle of interaction with an adult who meets the child at his current developmental level and who builds on the child's particular strengths.

Relationship Development Intervention (RDI) focuses on improving the long term quality of life for all individuals on the spectrum. The RDI program is a parent- based treatment that focuses on the core problems of gaining friendships, feeling empathy, expressing love and being able to share experiences with others.

SCERTS Social Communication and Emotional Regulation, and Implementing Transactional Supports provides a framework in which practices and strategies from other approaches may be integrated.

TEACCH Training and Education of Autistic and Related Communication Handicapped Children is tailored to language and how to form it using a desired object.

Sensory Integration Therapy using sensory experiences such as touch, movement, body awareness, sight, sound, smell, taste, and the pull of gravity to provide therapy.

PECS visual communication system using pictures and objects.

Occupational Therapy

Speech Therapy

Gluten Free, Casein Free Diet (GFCF)

The Individuals with Disabilities Act (IDEA) was revised in 2004 and renamed the Individuals with Disabilities Education Improvement Act. The law mandates that the state provide all eligible children with a free and appropriate public education that meets their unique individual needs beginning at the age of three.

The IDEA specifies that a child is legally entitled to receive early intervention services or special education services if the child meets the state eligibility requirements that define disability. Autism is specifically referred to in the IDEA as a condition that constitutes a disability.

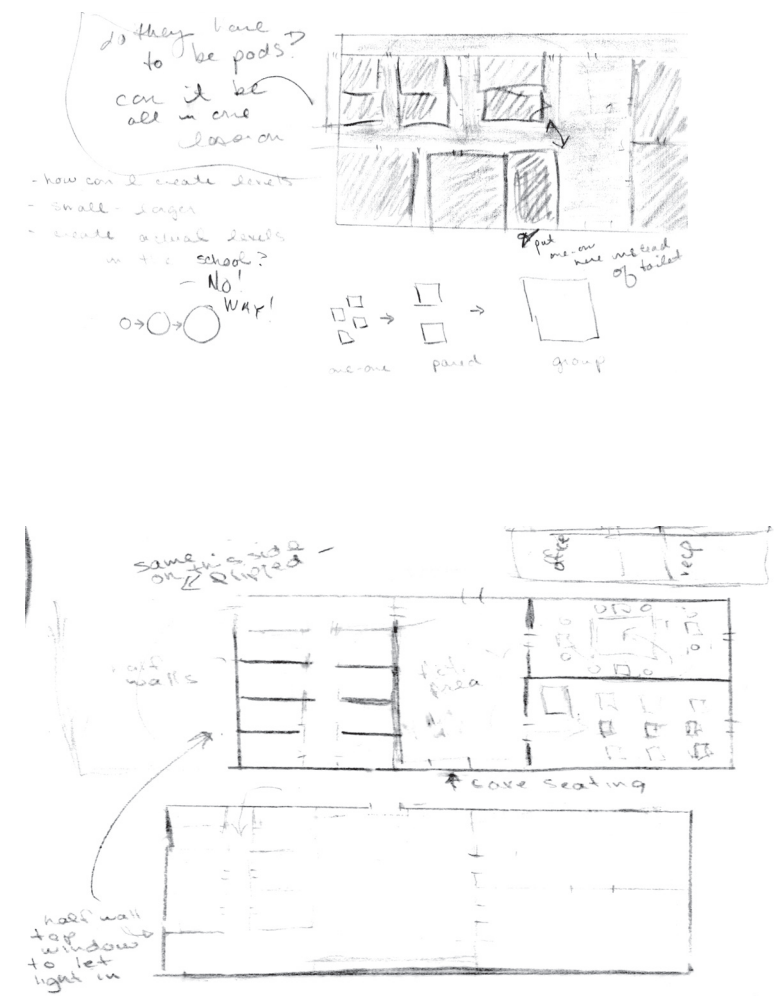
Children with Autism are entitled to the least restrictive environment, meaning that the child should be placed in the environment in which he or she has the greatest possible opportunity to interact with children who do not have a disability and to participate in the general education curriculum. Mainstreaming a child with autism or placing them with other students without disabilities in a school setting is an important part of development.

The following educational center is specifically targeted toward individuals with moderate to severe disabilities that may need extra services or who are not able to be mainstreamed into typical educational facilities. This center is specifically targeted toward services that include therapists, educators, psychologists and family members to provide the best quality early intervention.

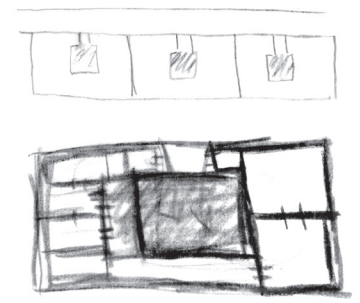
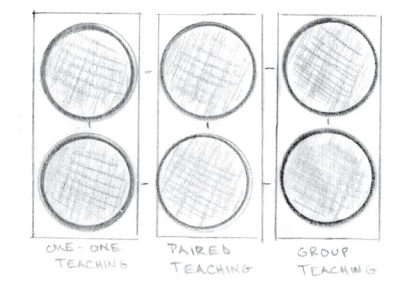
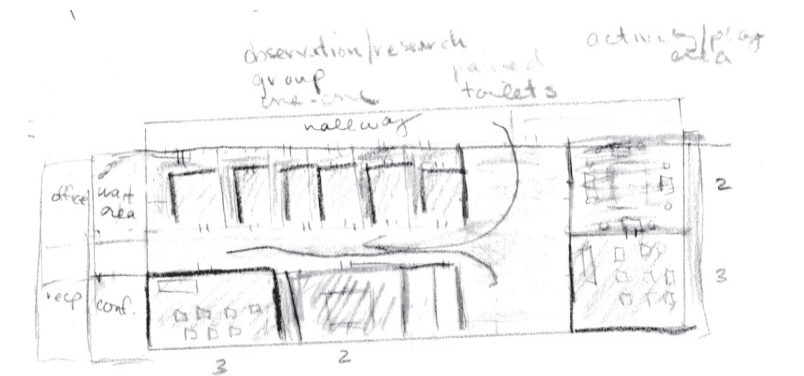
autistic children vs typical children

- Impaired ability to make friends with peers
- Impaired ability to initiate or sustain a conversation with others
- Absence or impairment of imaginative and social play
- Stereotyped, repetitive, or unusual use of language
- Restricted patterns of interest that are abnormal in intensity or focus
- Preoccupation with certain objects or subjects
- Inflexible adherence to specific routines or rituals

schematic design



These sketches allowed me to study classroom arrangements. At this point in my process work I was attempting to visualize how implementing therapy models of autism into each classroom would affect the final design.



adjacency diagrams/multiple intelligences

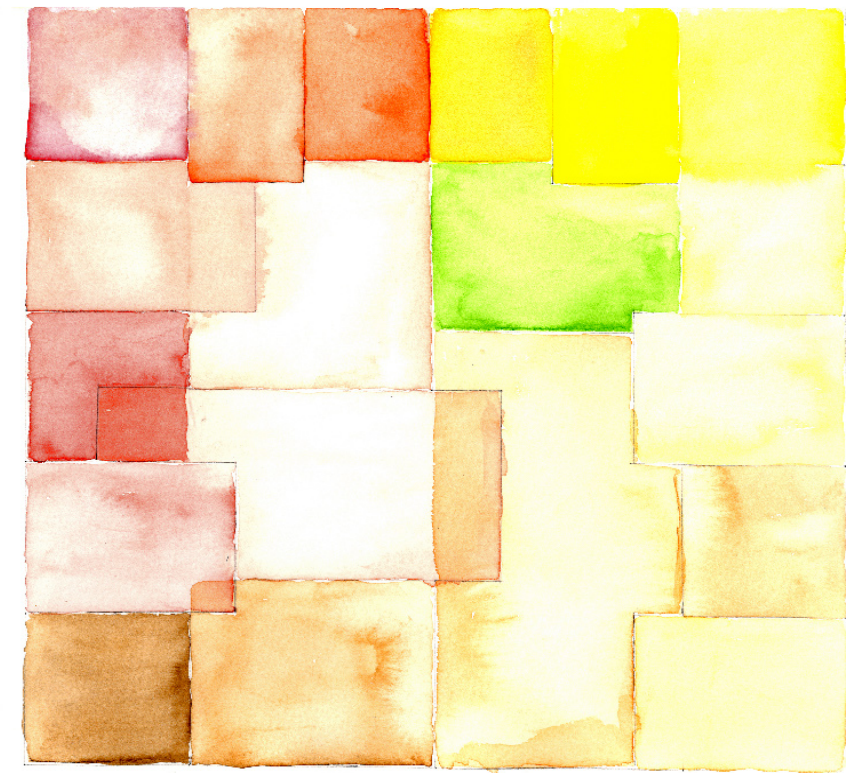
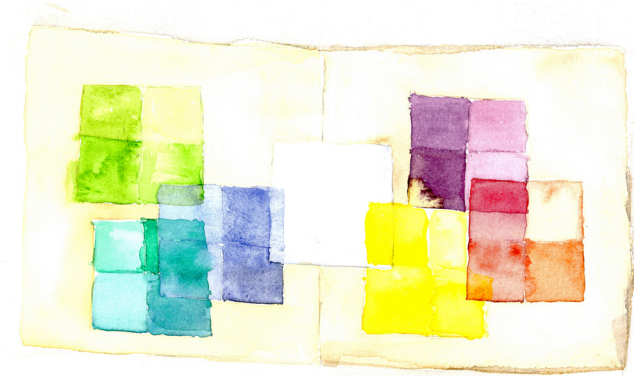
	Linguistic	Logical	Musical	Kinesthetic	Spatial	Naturalist	Interpersonal	Intrapersonal	Existential
Lobby/Entry	x	x		x	x	x	x	x	x
Stairway				x					
Walkthrough						x			
Reception	x	x					x		x
Offices									
Lounge								x	x
Café Area					x				
Quiet Area								x	
Bathrooms	x	x	x	x	x		x	x	
Kitchen								x	
Classrooms	x	x	x	x	x		x	x	x
Storage			x	x	x	x	x	x	x
Sensory				x	x		x	x	
Therapy	x	x							
Activity Area				x					

This diagram examines multiple intelligences and the spaces in my building that contribute to these intelligences. The more spaces that allow for different types of intelligences inside a building the better educational experience a student will receive. I attempted to make spaces multifunctional to allow these different intelligences to interact.

Adjacency diagrams showing the spaces in the building and their relation to each other.

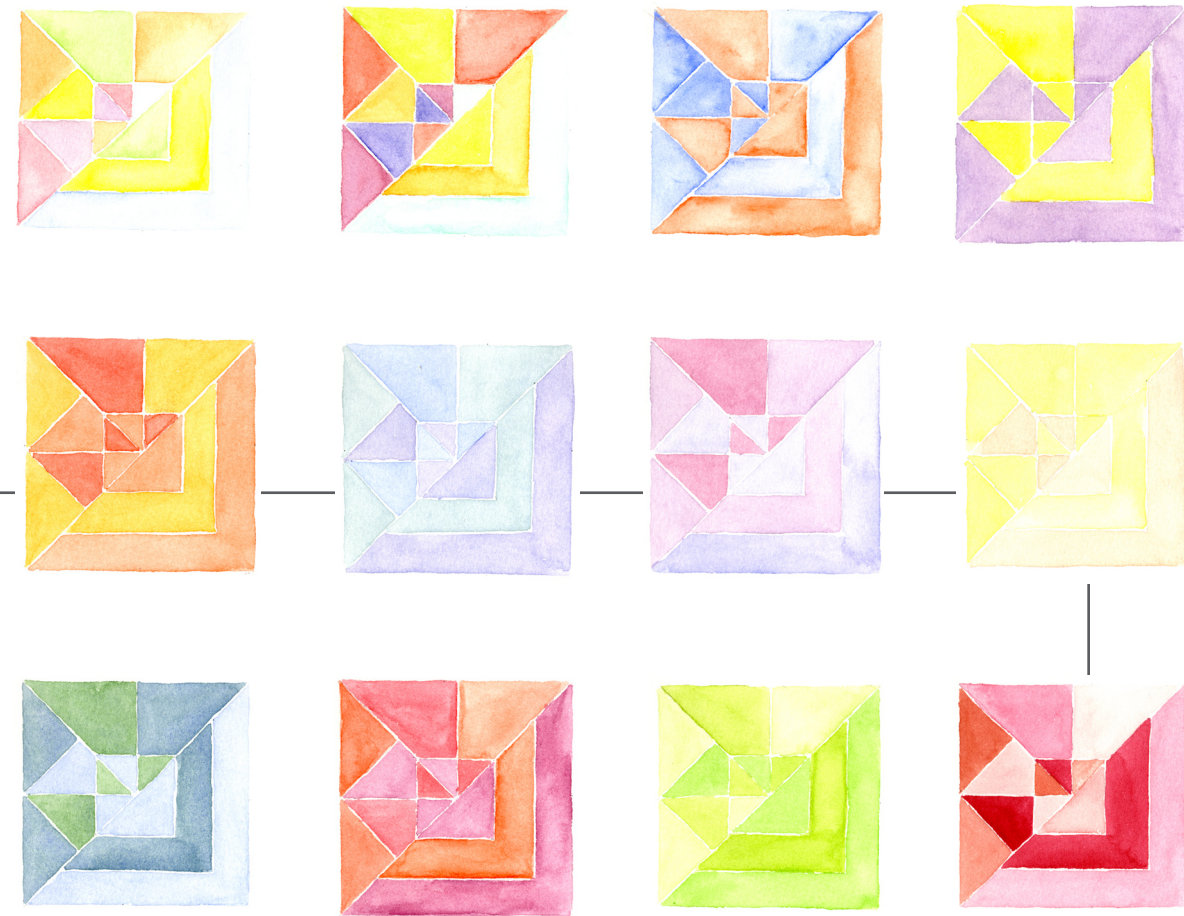
	Entry	Stairway	Walkthrough	Reception	Offices	Lounge	Dining	Quiet Area	Bathrooms	Kitchen	Classrooms	Storage	Sensory	Therapy	Activity
Lobby/Entry		x	x	x				x	x						
Stairway	x	x	x	x											
Walkthrough	x	x	x												
Reception	x	x		x	x			x							
Offices				x	x			x							
Teachers Lounge						x	x			x				x	
Café Area	x			x		x	x			x			x		
Quiet Area	x														
Bathrooms											x			x	x
Kitchen							x			x					
Classrooms									x			x	x		x
Storage											x	x			
Sensory Room													x	x	
Therapy Rooms					x								x	x	
Activity Area															x

programmatic studies



In these studies the spaces of the building were separated into sections and parts based on the amount of programmatic space needed.

water color studies

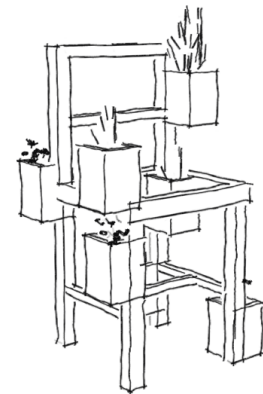
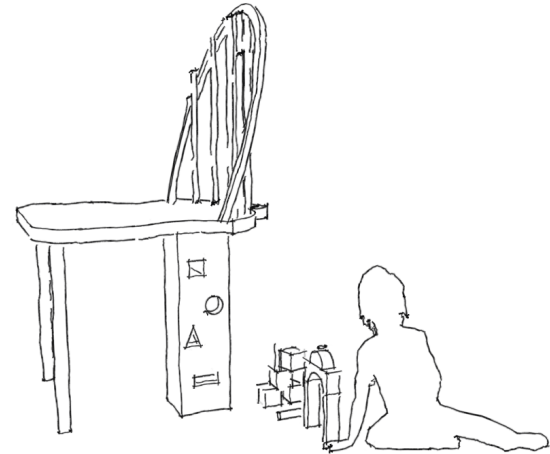
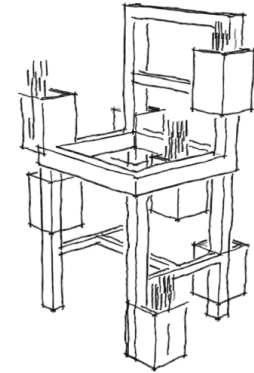


The following water color studies were done in an attempt to understand color theories, and how color can affect children with autism. Currently many educational centers use primary colors. Research has shown that these colors can be distracting and overstimulating for children with autism. Current studies also indicate that individuals with autism are calmed by warm monochromatic muted tones. Strong contrasting colors and surfaces are distracting and can often cause problems concentrating and functioning. Colors that calm, relax and nurture are excellent choices for learning environments. These studies represent primary, secondary, complementary, analogous, dark, light, cool, warm and monochromatic in successive order.

chairs with disabilities



chair study

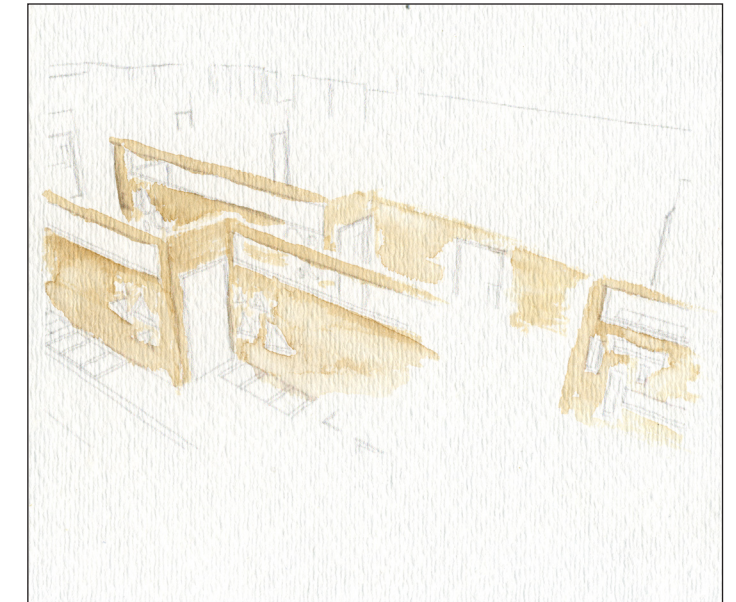
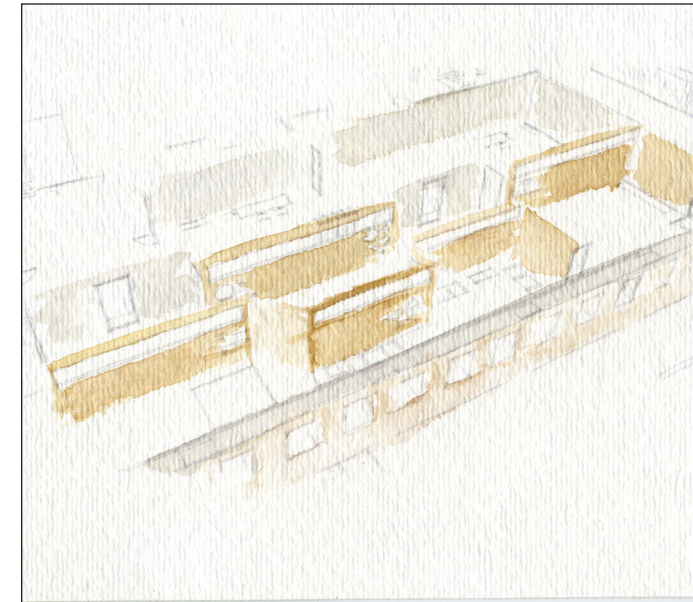


These chairs were collected as a concept study with the idea that I could design prosthetics for them. Similar to someone that has a disability and is fitted with a prosthetic, my hope is that they would also be given an enhanced ability or a new life. They are the children of my interiors study.

*Nothing can cure the soul
but the senses, just as
nothing can cure the senses
but the soul.*

~Oscar Wilde

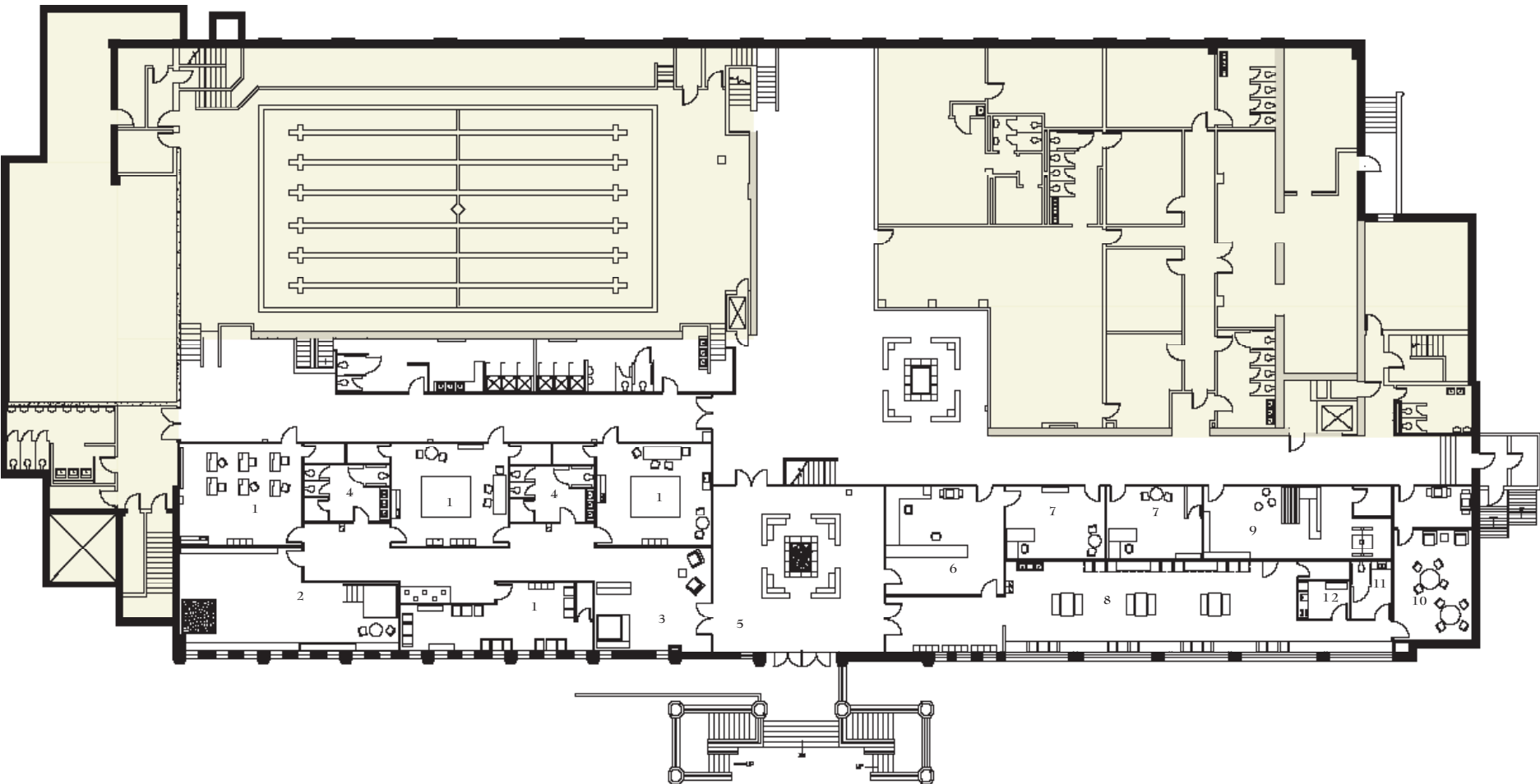
Chapter IV



Use materials and textures to create a series of way finding walls, and a sensory experience that will provide an atmosphere of muted tones and calmness.

The center will be able to accommodate 50 special needs children. Programmatic space will be approximately 8000 sq.ft.

- 1 intervention rooms(4)
(1606 sq.ft)
- 2 activity/freeplay room
(410 sq.ft)
- 3 quiet area
(483 sq.ft)
- 4 student restrooms(2)
(374 sq.ft)
- 5 lobby/waiting area
(1088 sq.ft)
- 6 reception
(483 sq.ft)
- 7 administrative
offices(2)
(490 sq.ft)
- 8 dining area
(1051 sq.ft)
- 9 sensory room
(518 sq.ft)
- 10 staff lounge
(464 sq.ft)
- 11 staff restroom
(90 sq.ft)
- 12 kitchenette area
(80 sq.ft)
closet space
(266 sq.ft)





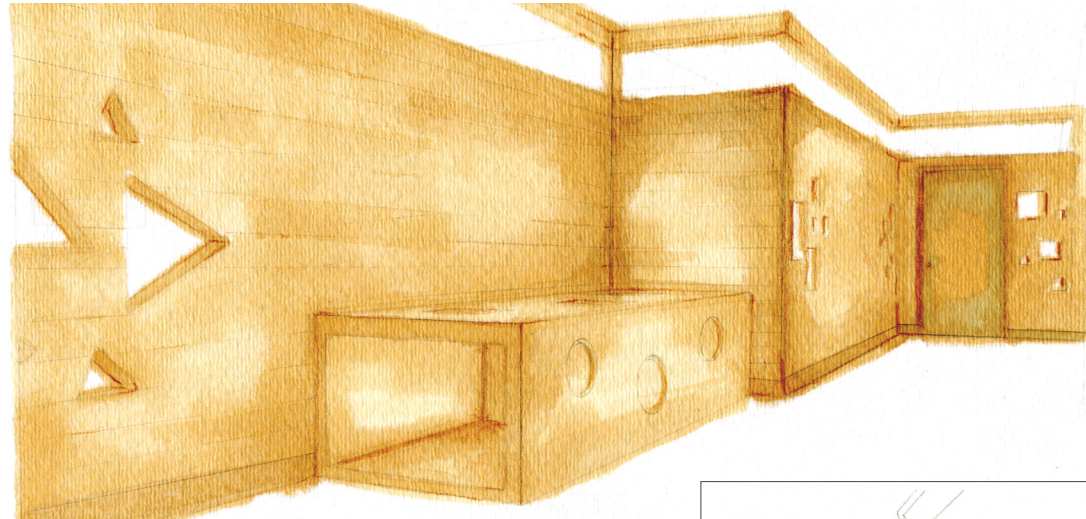
way finding walls / observation windows

Walls were designed to act as multifunctional entities within the intervention areas of the building. The goal is that the walls will function as way finding techniques for the children. Each early intervention room would be specified by a different shape. These openings would also be one way glass observation windows for parents, educators, or students doing research.

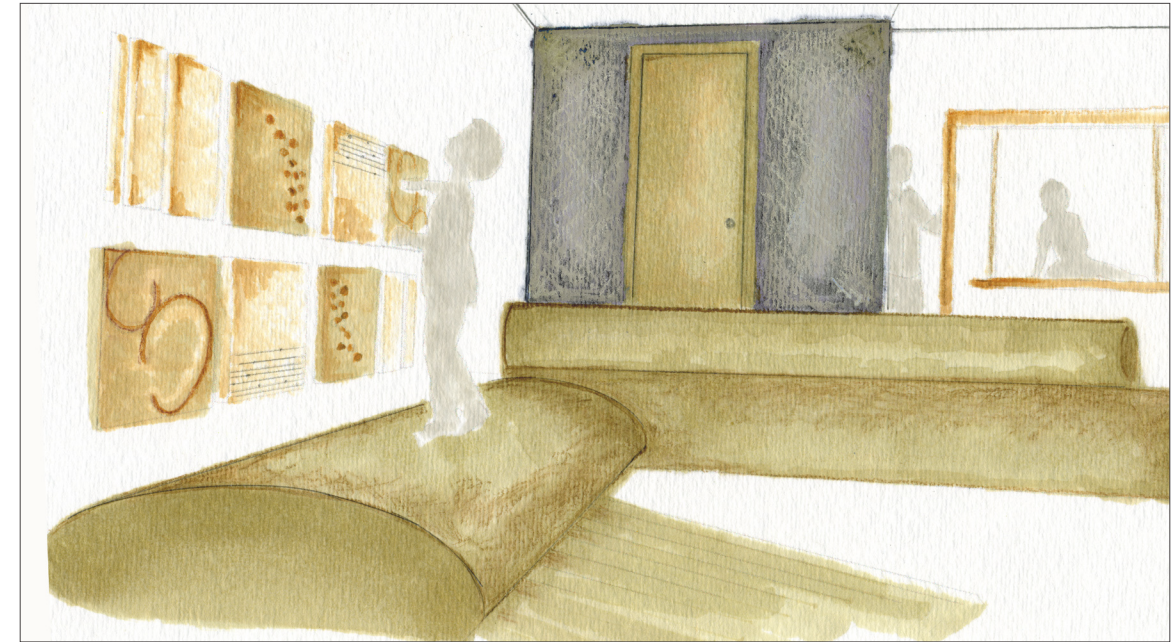
lobby / waiting area

The waiting area was inspired by healing gardens often used by hospitals for their patients. The space will be a retreat and area of stimulus for children, parents and for those waiting for therapy services. Plants that are velvety, or prickly to the touch, and are aromatic are a nice sensory experience for children with autism. The space is also to be a walkthrough for students that use the building for classes as well.



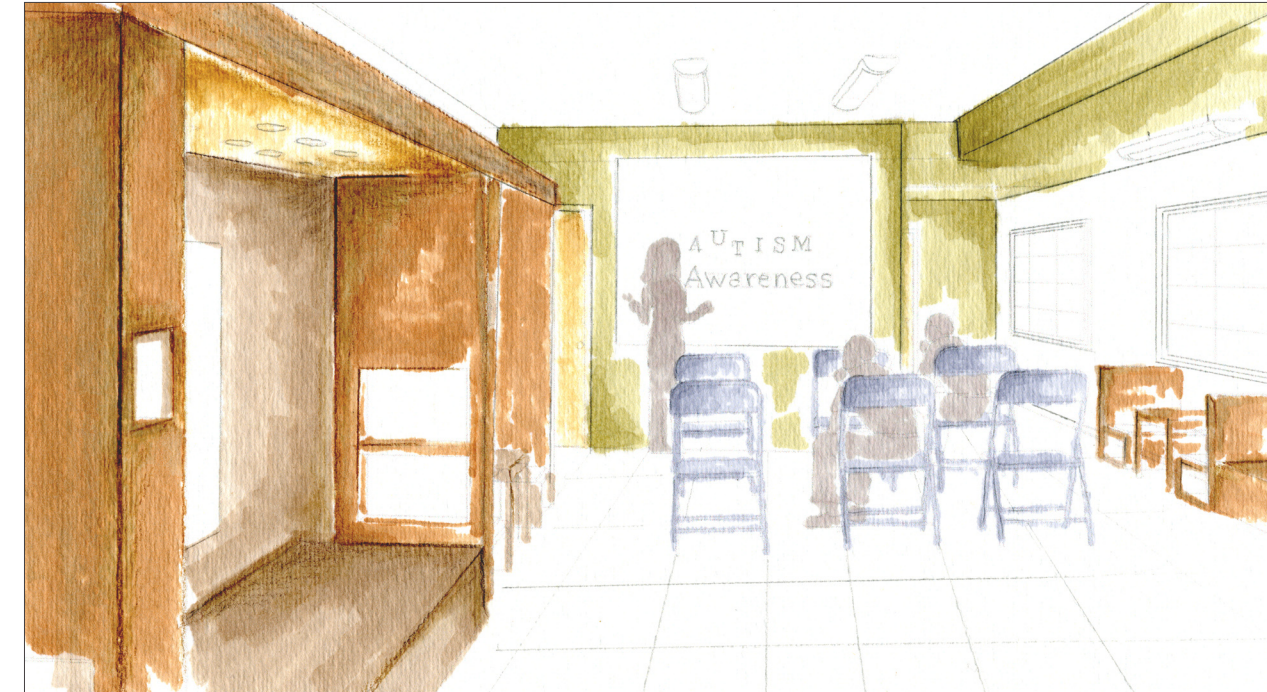
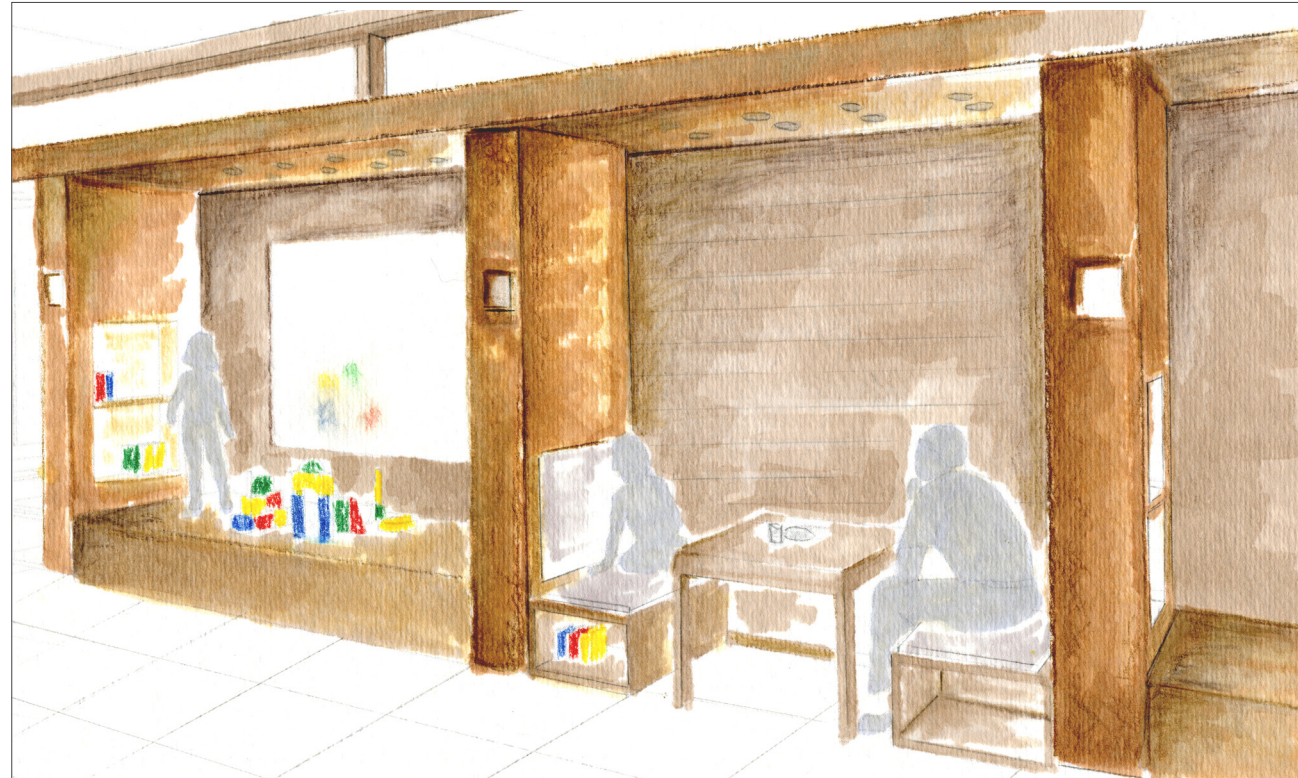


play/activity room



niche areas for interactive play and a sensory room

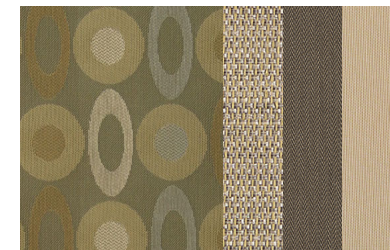
Areas that allow for play and interaction to occur were placed throughout the building. Children with autism often lack social skills such as eye contact, communication abilities and do not understand social cues such as turn taking. These areas will hopefully stimulate social situations that are the dominant struggle in children with autism. Sensory integration issues are also problematic for these individuals. A sensory room was included in the design of this center to calm and stimulate children through the use of the five senses. A built in tactile wall was designed in this room to provide stimulation. Cushions or couches that children can lounge, jump or stand on are also important. Children often have a reduced sensitivity to pain, and are sensitive to sound, touch, or other sensory stimulation. They often rock, twirl and swing their bodies to provide stimulation. Therapeutic platform swings are also used in sensory rooms to compensate for these difficulties.



dining area / presentation area

Spaces in this center were designed to be flexible and multifunctional. The dining area was designed with booth seating to create comfortable nooks for eating, playing and learning. The spaces will hopefully entice children to sit instead of run around. The area will also be able to be used after educational hours as a space for meetings and interaction for the surrounding community and students.

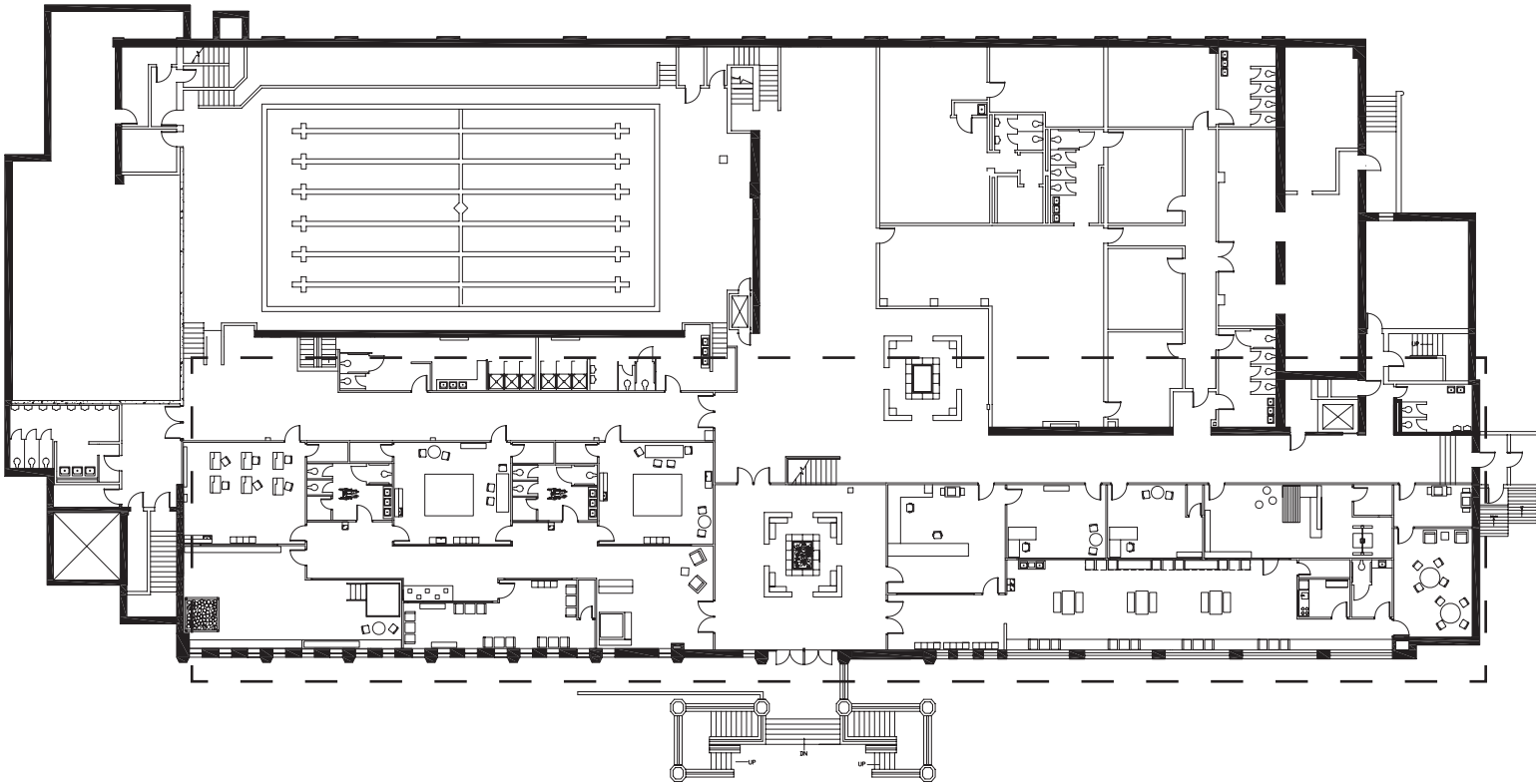
Materials are important to the design of this center. Because children with autism are very easily distracted, have sensory issues, and behavioral issues, it is important to choose materials that will keep these issues at a minimum. Due to research showing that warm muted tones are ideal (vs bright strong contrasting tones), these types of colors were chosen for the color scheme. Reclaimed wood will be used for the walls, to keep the space warm and inviting, similar to a home environment, allowing children to feel comfortable and safe. Fluorescent lighting that flickers can be distracting therefore incandescent indirect lighting is used throughout the entire building. Shiny surfaces can also be distractions for these children, so carpeting is used in all intervention rooms, to prevent glare, as well as allow children to play on the floors. Other surfaces include textured walls, and environmentally friendly flooring and counter surfaces.



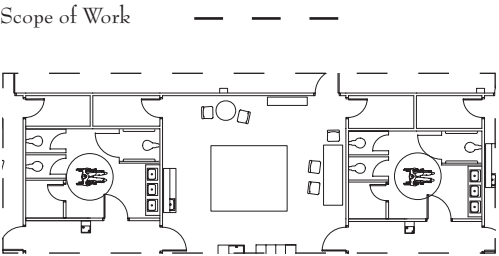


Appendix





Building Code	2003 IBC
Handicapped Code	National ADA
Use Group	R
Occupancy Load	TBD
Total Square Footage	8,000 sq.ft
Fire Alam System	Yes
Sprinkler System	Yes
Handicapped Accessible	Yes



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